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why TSI?

timber stand improvement
... increases profits

Woodland Owners:

TSI (Timber Stand Improvement) can speed up the growth and raise the quality of your trees. TSI coupled with other improvement practices can help increase the enjoyment and profits from all of your forest resources. This folder outlines ways this can be done.

Your Forester

Introduction

Demands for wood and wood products to supply our growing population are mounting. The overall requirement for wood is expected to increase by about 133% by the year 2020. We also face mounting demands for the other resources of our woodlands: water, special forest products, recreation, forage, wildlife, and natural beauty. More and more, landowners and land managers have adopted the objective of multiple use resource management and continuous production in the management and utilization of forest lands. Intensified management and the application of measures to improve production and quality can go a long way toward meeting the needs of the woodland owner and the Nation.

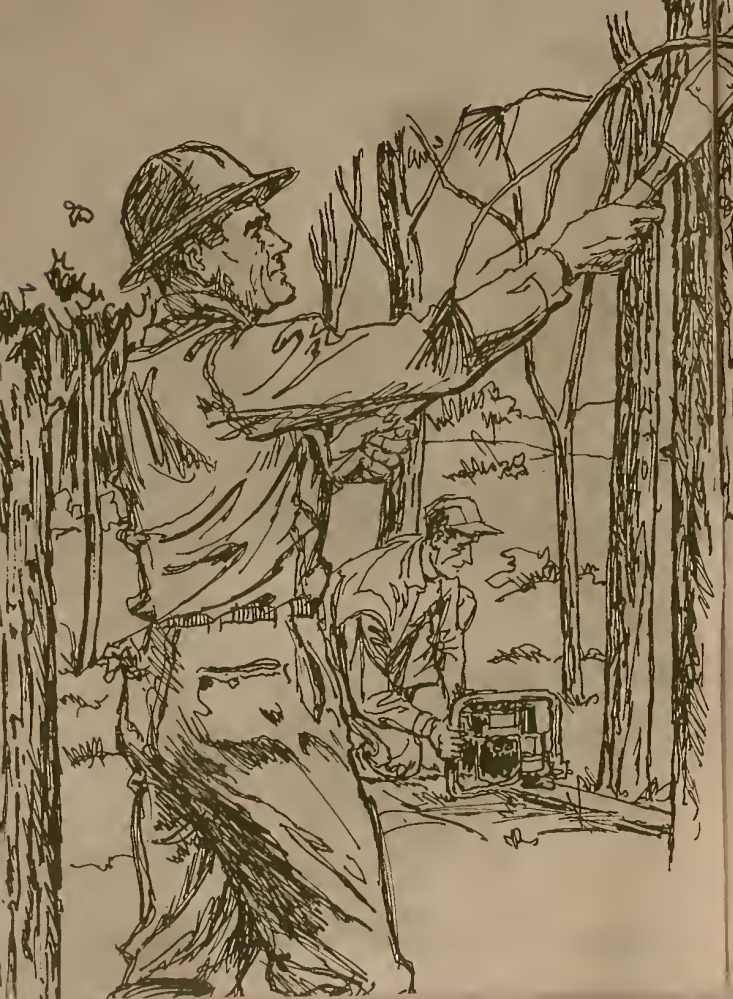
Under multiple use management the potentials and limitations of a forest are considered and evaluated. This makes possible decisions that lead to the production of goods and services in a combination that will best meet the needs and desires of the owner. TSI (timber stand improvement) is frequently a key tool in achieving the owner's objectives.



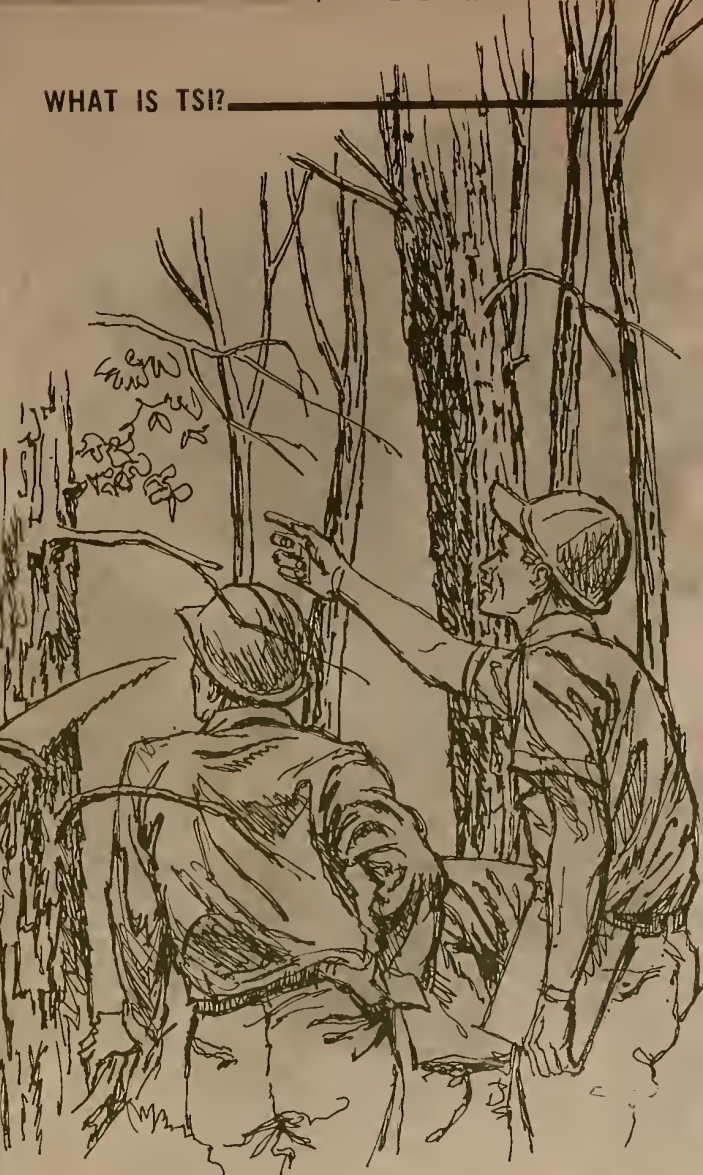
Introduction

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WHAT IS TSI?



TSI is a term used to identify various management practices designed to improve the vigor, stocking, composition, productivity, and quality of forest stands. These practices include weeding, thinning, and pruning. The chief aim of TSI is to make forest management more profitable through sustained production of more and better timber products. TSI can convert a nondescript collection of trees into a dynamic working forest. TSI measures are applied to established timber stands; they provide some of the most effective ways for a forest landowner to realize a return on his investment. Forest owners should consult a forester about TSI, which is one of the most valuable forestry tools available.

RELATED IMPROVEMENT PRACTICES



Forest resource improvement measures that do not directly affect timber growth or quality are receiving increasing attention. They, too, are needed to increase the effectiveness of multiple use management. Timber stand improvement measures should be designed and carried out to improve timber crops as well as to benefit all other resource values (water, special forest products, recreation, forage, wildlife, natural beauty) as much as possible in order to meet the landowner's objectives. Fortunately, in most cases work done to benefit one resource proves beneficial to others as well.

Let's see what planned, properly applied TSI and related management practices can do for the various forest resources.

Timber

Just as an untended garden seldom produces bumper crops of vegetables, so a neglected forest seldom produces large quantities of high-value timber. One of the major problems in forestry today is how to improve the quality of the logs that are needed to supply wood-using industries. This is particularly true of the fine hardwood species.

Measures to improve timber production include:

- **Weeding** young stands to remove unwanted species and make more room for higher value trees.
- **Thinning** to relieve overcrowding and increase the growth rate of potential crop trees left as the residual stand.
- **Release** of vigorous young potential crop trees for faster growth and better quality by removing overtopping trees.
- **Pruning** the lower stem of selected trees to produce knot-free timber for sawlogs, veneer logs and other products.
- **Cull tree removal** to make available growing space occupied by deformed or defective trees that are not marketable.
- **Sanitation cutting** to remove trees that harbor insects or diseases for the protection of the remaining stand.

While the following related measures are not included in the traditional TSI concept, they are essential to forest improvement and affect total timber production and property value.

- **Harvesting** timber crops in ways that will provide for desired natural regeneration, stimulate growth and improve the quality of the remaining stand, or lessen the danger of insect and disease outbreaks.
- **Site preparation** for seeding, planting or natural regeneration to obtain better survival and healthier stands of young seedlings.
- **Seeding or planting** to improve stocking or to reforest cutover or idle lands.

Substantial improvement of timber stands is possible with management practices that do not require "out of pocket" costs. For example, a sale of pulpwood sometimes can result in thinning, salvage, sanitation, and release benefits comparable to those obtained by investment in the TSI measures outlined above.

Fire as a Forest Improvement Tool

Wildfire can destroy a young plantation or a mature old forest in a matter of hours. When it does, it wipes out jobs and investments as well as trees, wildlife, recreation, and watershed values. No woodland owner should be without an adequate fire protection plan for his forest.

But, in some cases, well controlled fire in the forests can be beneficial. In the hands of an experienced forestry team, "prescribed burning" can be a highly effective tool for protection, management, and forest improvement. Properly employed, fire can be used to:

- **Backfire** against going fires and to clear fire protection breaks in green forests.
- **Burn logging slash** (mainly in the West) to prepare the ground for a new crop of trees, to reduce the wildfire hazard, and to reduce possibility of bark beetle infestations.
- **Burn the brush and grass** beneath a pine stand in the South to prepare a seedbed or to release already established pine trees.
- **Burn over a stand** of young longleaf pine trees to control brown spot disease.
- **Burn the fuel** on the forest floor periodically so that heavy volumes do not accumulate to endanger the survival of the forest if wildfire should strike.

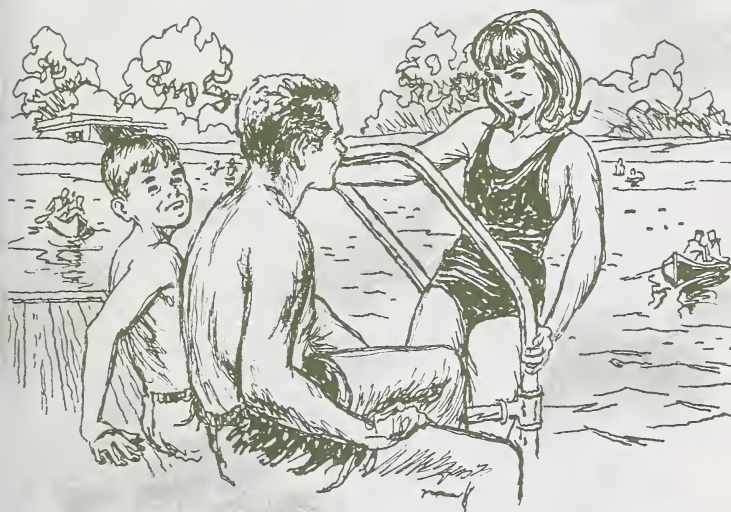
Landowners interested in the use of prescribed fire to improve or protect their woodlands should consult State service foresters. They should be fully acquainted with State burning laws and should never attempt to use fire in their woods without the expert help of a forester.

Watershed ---

Forest land with its trees, plant cover, forest litter, and humus, functions like a giant blotter—soaks up water from rain or melting snow. Some of this water goes back into the air through evaporation; most of it penetrates the surface and is stored in the ground or gradually released. Part of the stored water is taken up by plants to be used or transpired back into the air, part of it moves slowly downhill to feed streams and lakes.

An ample water supply—to protect our communities from fire, to use in our homes, to grow agricultural crops, to support our industries, and to provide swimming, boating, and fishing—depends on properly functioning watersheds. Most watersheds include farms, family-owned forests, and other holdings. The water-holding condition of each is important. Collectively, they determine the quality and quantity of the water on which the community depends.

The power to change the surface of a watershed, for good or bad, lies in the hands of man. It is a great responsibility. Specific measures to improve and maintain efficient forest watersheds, produce unpolluted water, and prevent or control soil erosion include:



- **Planting or seeding trees, shrubs, and other plants** to obtain a continuous ground cover and prevent silting of streams and lakes.
- **Protecting and managing timber** to maintain an adequate ground cover in a healthy growing condition.
- **Taking special care** in planning, locating, and constructing roads, skidways, landings, trails, and other developments so as to minimize soil erosion.
- **Installing, as needed, water bars, check dams, diversion ditches and other measures** to hold soils in place.
- **Preventing the use of woodlands as dumps for trash, garbage, and other refuse** which causes water pollution.

Recreation and Natural Beauty



Recreation and Natural Beauty



More and more, the working forests of America are being managed for beauty as well as commercial use. Many owners provide a public service as they supplement their income with recreation enterprises while their timber crops mature. Following are some of the measures that can be used to enhance forest property for recreation use and natural beauty:

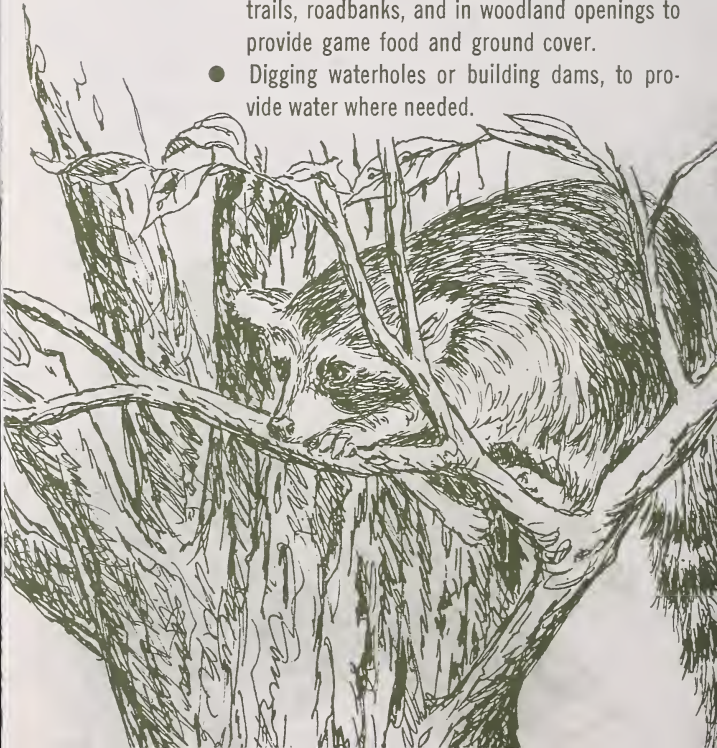
- **Creating and maintaining open stands** for camp-sites, picnic areas, and other needs. This can be done with little loss of timber growth through good planting and careful cutting.
- **Removing insect infested, diseased, or damaged trees** that threaten the health and beauty of the forest or the safety of its users.
- **Maintaining or establishing continuous buffer strips** of trees and shrubs as needed to screen undesirable features of the landscape or to increase privacy, comfort, or safety.
- **Using trees and other vegetation** to enhance ponds, lakes, streams, and other water-oriented recreation sites.
- **Planting or seeding** so as to create harmonious patterns, pleasing to the eye.
- **Creating an interesting variety of forest patterns** by harvesting timber with attention to how the remaining stand will look.
- **Managing the forest** to favor trees and shrubs that add the beauty of flowers in the spring and of colorful fruit and foliage in the autumn.
- **Creating and maintaining vistas** to permit easy viewing of outstanding forest landscapes.
- **Improving logging roads and skid trails** for access to beauty points.

Wildlife

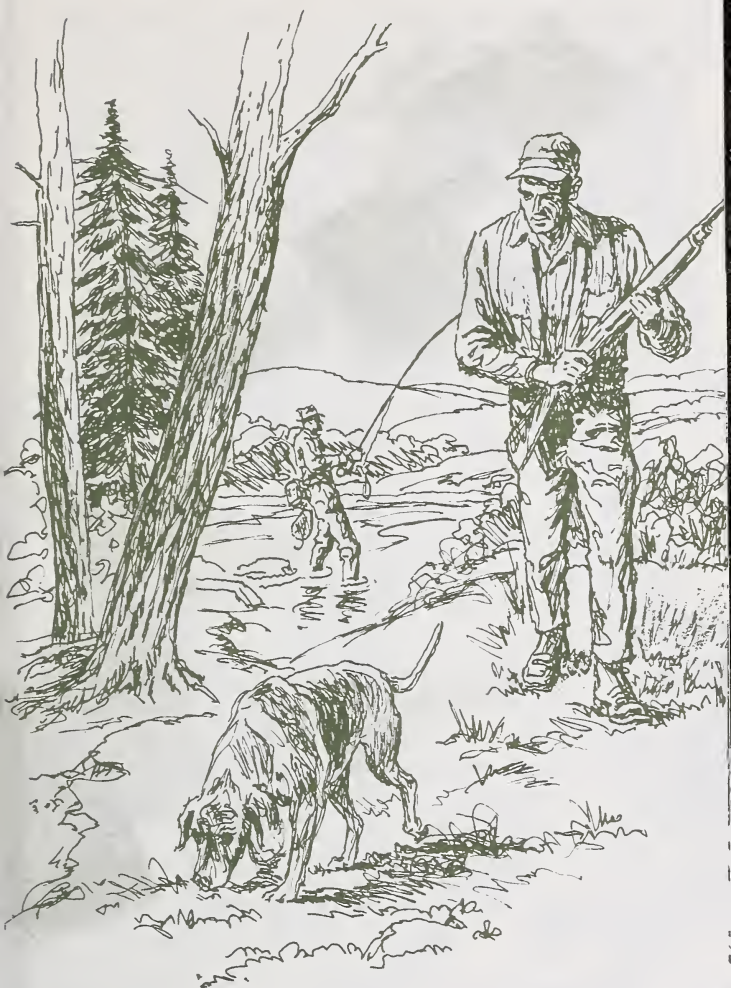
The forest provides a natural home for wildlife. However, the way a woodland is managed influences the species, numbers, variety, and condition of the wildlife population. In order to produce wildlife in abundance, the woodland must have a plentiful supply of good food and water close to cover that affords protection from enemies and weather. Managing timber lands to meet wildlife habitat needs involves improving the amount, quality, and distribution of food, cover, and water.

The following measures can be used to enhance the wildlife habitat:

- Managing for a variety of age classes of trees to insure continuous supplies of food and shelter.
- Maintaining interspersed areas of both conifers and hardwoods where needed for protection.
- Saving den and nesting trees when cutting hardwood timber.
- Leaving piles of brush near the edge of woods to provide cover for small animals and birds.
- Releasing crowded and overtopped mast and fruiting trees and shrubs to increase production of acorns, nuts, fruits, berries, and other game food.
- Planting clovers and grasses on logging roads, trails, roadbanks, and in woodland openings to provide game food and ground cover.
- Digging waterholes or building dams, to provide water where needed.



Hunting and Fishing



The sale of hunting and fishing privileges can provide additional income for many woodland owners. Improving the habitat to produce greater numbers of game birds, animals, and fish will aid such an enterprise. Additional measures that can improve forest lands for hunting and fishing include:

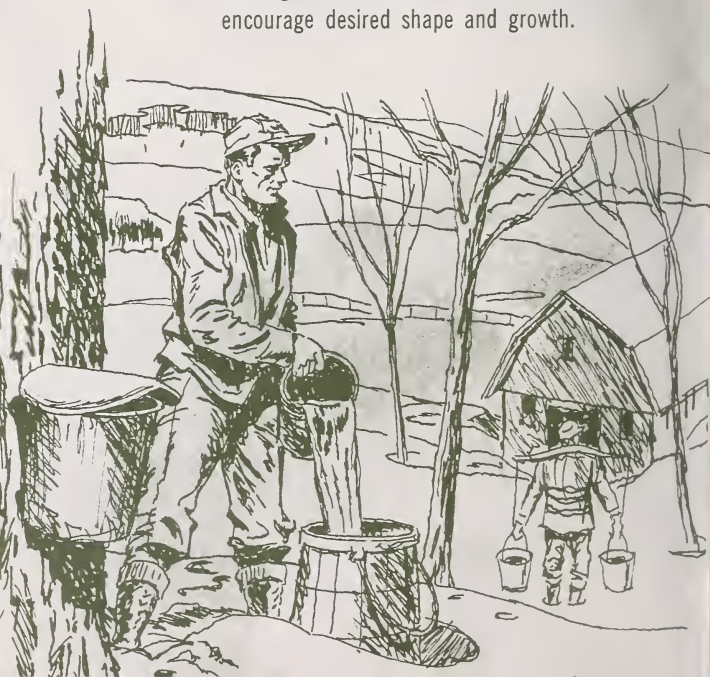
- **Building and maintaining** access trails through hunting areas and along streambanks and lake shores.
- **Keeping** shooting lanes and clearings open.
- **Cutting** brush at intervals to provide clearings on stream and lake shores for easier fishing.
- **Leaving or planting** brush species at appropriate locations to provide natural blinds for hunting waterfowl.

Special Forest Products

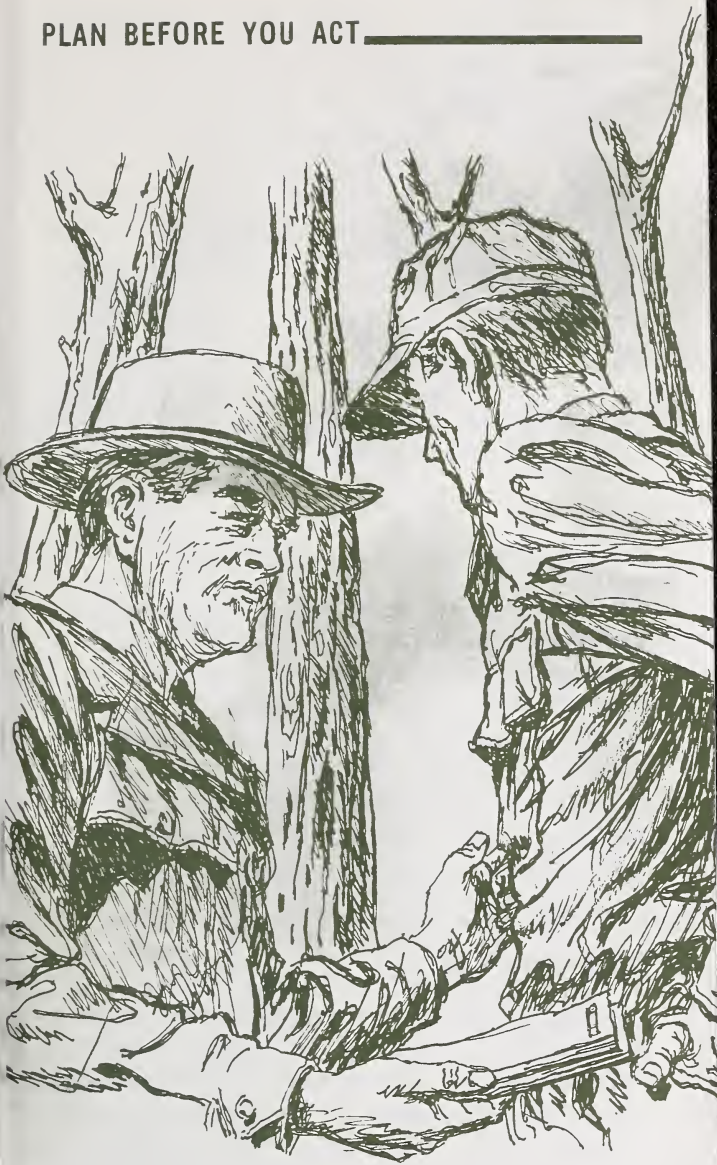
Many owners have discovered one or more saleable special forest products (nontimber products) growing in their woodland. Special forest products include such items as Christmas trees, maple syrup, nuts, fruits, berries, naval stores, floral supplies, and crude drug items. There are several hundred others. These can provide an income while the trees are growing. Collectively, special forest products represent a multi-million-dollar business in the United States.

Some TSI measures that can be adapted to increase the production and improve the quality of special products are:

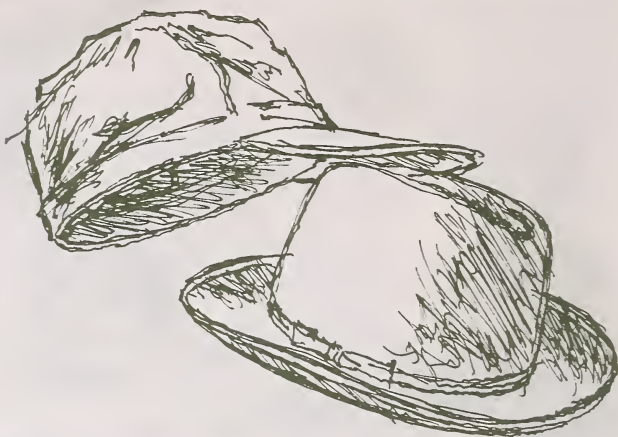
- **Removing** brush, thinning, pruning, or shearing to obtain well-shaped Christmas trees.
- **Thinning** stands of sugar maple to grow better-crowned and healthier trees for sap production. The same practice can be applied to longleaf and slash pine managed for naval stores.
- **Cutting** undesirable trees to favor trees and other plants that produce nuts, fruits, or berries.
- **Maintaining** the right amount of shade over areas producing decorative materials such as huckleberry, salal and sword fern.
- **Planting** Christmas tree, fruit, nut, berry, ornamental or other species to produce special products.
- **Pruning** ornamental or decorative plants to encourage desired shape and growth.



PLAN BEFORE YOU ACT



The foregoing discussion suggests some of the options of resource management open to you as a woodland owner or manager. You can benefit immensely if a professional forester helps you determine, analyze, and evaluate the potentials and limitations of your forest land. You can then decide what your opportunities are and what you want from your forest. Accordingly, the forester can help prepare a management plan which includes those TSI and related practices most feasible and helpful to you in achieving your objectives.



Professional Advice

Any woodland owner or manager interested in the forest improvement measures discussed in this brochure should see a professional forester for advice and assistance. State-employed foresters provide such services in most areas. They will call on landowners to assist with planning, management, protection, and utilization of their forest properties. Requests for such help can be made to the State Forester. In some areas, assistance is available from other public and privately employed foresters. Any U.S. Department of Agriculture office can help you get in touch with a nearby forester.

Conservation Planning

Landowners in any of the Nation's soil and water conservation districts can get assistance in developing conservation plans for their land. A soil conservationist, using a soil map as a base, will help you decide how your land can best be used. He will help you plan soil and water conservation practices that will aid in protecting and improving your resources. Soil Conservation Service offices can provide information about timber stand improvement, and also about tree planting crews or machines and other equipment available through the local soil and water conservation district.

Cost Sharing

A woodland owner may wish to consider the possibility of financing some of his forestry practices through federal cost sharing. The Agricultural Conservation Program may share with landowners the cost of improving existing stands of trees and the cost of planting trees and shrubs for forest, windbreak,

shelterbelt, wildlife food and shelter, and erosion control purposes. The Forestry Incentives Program (FIP) is available in certain designated counties and provides cost-share assistance for both tree planting and improving existing forest stands for timber production purposes. FIP generally applies to owners of forest tracts less than 500 acres in size and capable of producing crops of industrial wood.

Applications for cost-sharing on forestry practices can be filed annually and if approved, the cost share is paid after completion of forestry work that complies with locally approved specifications. Long-term agreements are available under both ACP and FIP.

To participate in the program, contact your local county Agricultural Stabilization and Conservation (ASC) office or your State service foresters.

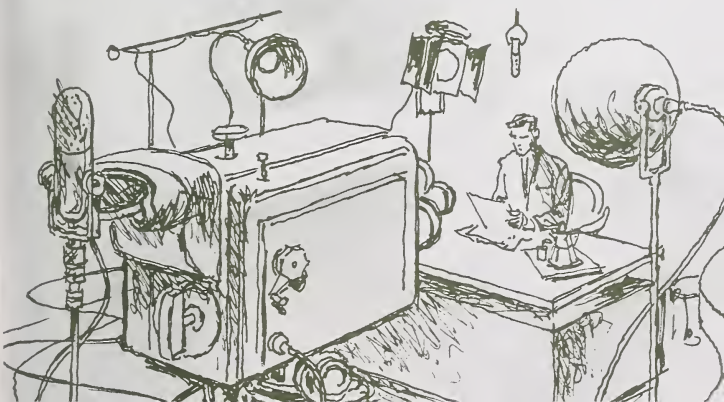
Forestry Purpose Loans

Farmers who own woodlands and are unable to obtain credit at a reasonable cost elsewhere may be eligible to borrow funds from the Farmers Home Administration for TSI work as well as other approved forestry purposes.

Information on forestry purpose loans is available at the local Farmers Home Administration office.

Information

State Extension Service foresters furnish information and education services for woodland owners. These services include advice, demonstrations, and training in such things as multiple use forest management and protection, recreation, forest esthetics, Christmas tree production, windbreak planting, harvesting methods, marketing, business management, and safety. They also conduct short courses and seminars, distribute publications, and present radio and television programs. Further information can be obtained from county agents.



State-Federal-Private Forestry Cooperation_____

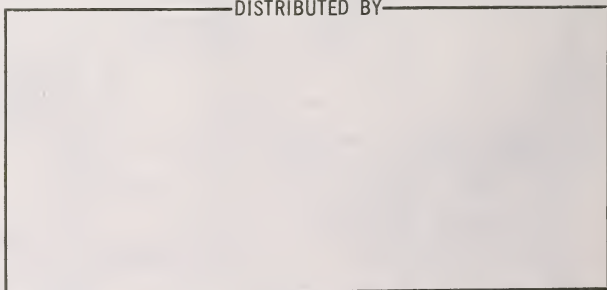
As our Nation grows, people expect and need more from their forests—more wood; more water, fish and wildlife; more recreation and natural beauty; more special forest products and forage. The Forest Service of the U.S. Department of Agriculture and the State forestry agencies help to fulfill these expectations and needs through cooperation with each other, with other State and Federal agencies, and with private landowners. For its part, the Forest Service engages in three major activities:

- Participating with State and related Federal agencies in cooperative programs to help protect, improve and utilize our Nation's 395 million acres of State, local, and private forest lands.
- Conducting forest and range research, often in cooperation with State and private agencies, at over 75 locations ranging from Puerto Rico to Alaska to Hawaii.
- Managing and protecting, for multiple use purposes, the 187-million acre National Forest System, much of which is intermingled with State and private forest lands.

For nearly 70 years, the State forestry agencies and the Forest Service of USDA have been working effectively together to improve America's forest resources. Traditionally, their people have been an active part of the communities and towns in which they live and work. They strive to secure for all, continuous benefits from the country's forest resources.



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